MITSUBISHI ELECTRIC
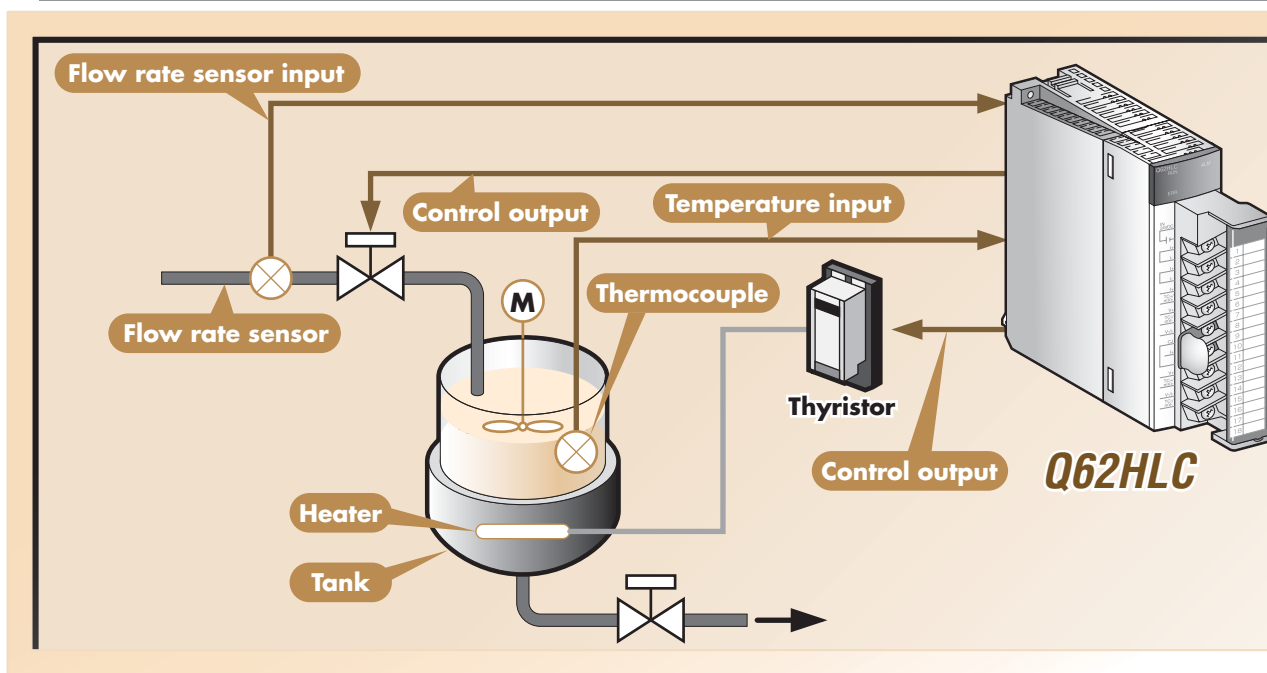Mitsubishi PLC

Changes for the Better

October 2005

New Product Release
No.235E

Q62HLC
Loop Control Module

The New Loop Control Module
Ideal For Fast Response Control*

*Examples: • Control of rapid temperature increases at flip chip bond IC manufacturer.
• Drying oven cooling temperature control on freeze drying machines.

Staggering 25ms sampling and control update time, an industry first.

Supports sensor types, such as thermocouple, microvoltage, voltage, and current input ranges.

Continuous proportional PID control by 4 to 20mA current output results in highly stable and accurate control.

Flow rate sensor input

Control output

Temperature input

Thermocouple

Thyristor
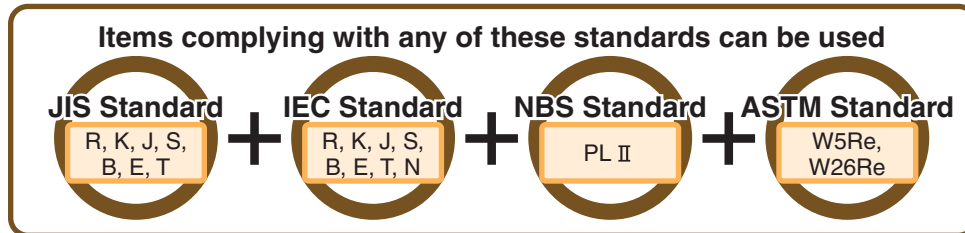
Control output

Q62HLC

Flow rate sensor

Heater

Tank

1. High-Speed PID Control

The Q62HLC loop control module uses a continuous proportional PID control format, which features a sampling period of 25ms for high-accuracy, high-resolution thermocouple inputs, microvoltage inputs, voltage inputs, current inputs, and current outputs. These features make the Q62HLC ideal for applications such as rapid temperature increase control, pressure control, and flow rate control.
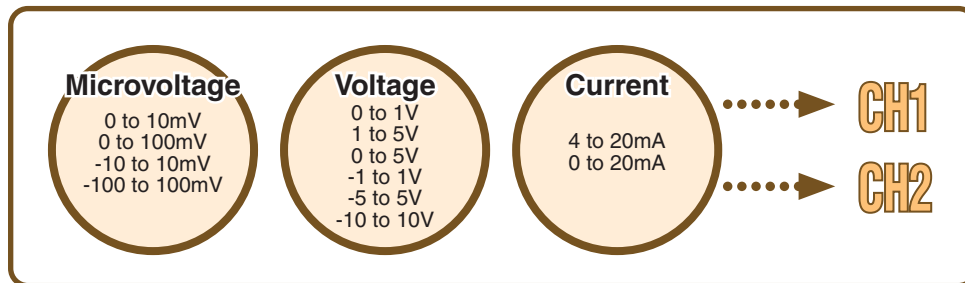
2. Connectable to Thermocouples that Comply with Major International Standards

The Q62HLC supports thermocouples which comply with the JIS, IEC, NBS, and ASTM standards.
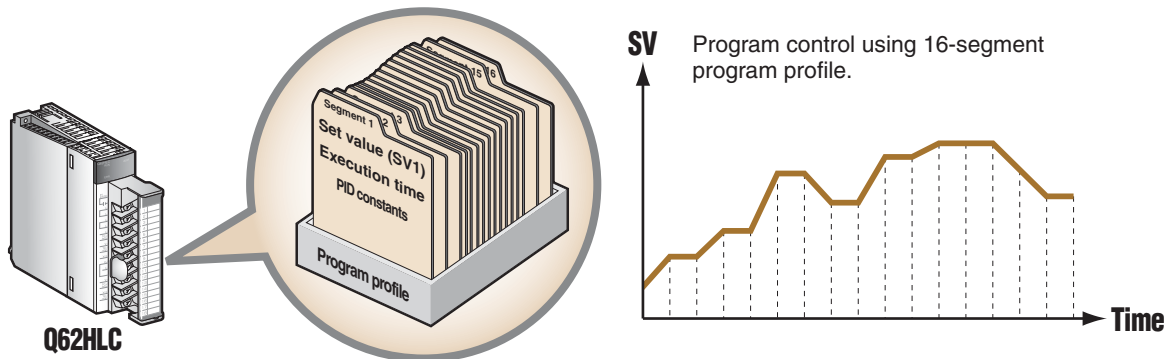
Items complying with any of these standards can be used

JIS Standard
R, K, J, S, B, E, T

+

IEC Standard
R, K, J, S, B, E, T, N

+

NBS Standard
PL II

+

ASTM Standard
W5Re, W26Re

3. Supports Variety of Input Ranges

The use of an input sensor (microvoltage, voltage, and current inputs) enables analog value measurements in the ranges shown below.

Microvoltage
0 to 10mV
0 to 100mV
-10 to 10mV
-100 to 100mV

Voltage
0 to 1V
1 to 5V
0 to 5V
-1 to 1V
-5 to 5V
-10 to 10V

Current
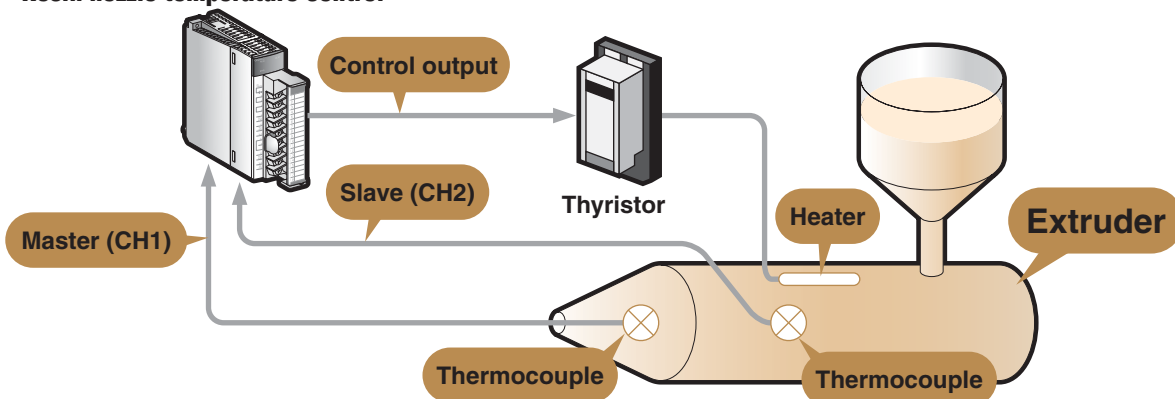4 to 20mA
0 to 20mA

CH1
CH2

4. Program Control Function

Control program profiles can be specified where set values (SV) and PID constants (proportional band [P], integral time [I], differential time [D]) are automatically changed at specified times.

Segment 1 2 3
Set value (SV1)
Execution time
PID constants
Program profile

Q62HLC

SV   Program control using 16-segment program profile.

Time

5. Cascade Control Function

Cascade control can be performed with channel 1 as the master and channel 2 as the slave.

Resin nozzle temperature control

Control output

Slave (CH2)

Thyristor

Heater

Extruder

Master (CH1)

Thermocouple

Thermocouple

1

(1) Performance specifications

Item	Specifications		
Number of analog input/output points	2 channels per module		
Analog input specifications		**Analog output specifications**	
Item	**Specifications**	**Item**	**Specifications**
Number of input points	2 points (2 channels)	Number of output points	2 points (2 channels)
Analog input	See item (2)	Digital input	Binary with 16-bit symbol
Digital output	16-bit binary value	Analog output	Current
Supported thermocouples	K, J, T, S, R, N, E, B, PL Ⅱ, W5Re/W26Re	−	−
Input characteristic	See item (2)	Output characteristic	When using simple analog output: Digital value: 0 to 4000 Output range: 4 to 20mA
Maximum resolution	See item (2)	Maximum resolution	$4\mu A$
Accuracy*1 — Command accuracy — Ambient temperature: 23℃ ± 2℃	See item (3) (a)	Command accuracy — Ambient temperature: 23℃ ± 2℃	Full scale x (±0.2%)
Command accuracy — Ambient temperature: 0℃ to 55℃	See item (3) (b)	Command accuracy — Ambient temperature: 0℃ to 55℃	Full scale x (±0.4%)
Command accuracy — Ambient temperature: 23℃ ± 2℃	±0.5℃	――	――
Command accuracy — Ambient temperature: 0℃ to 55℃	±1.0℃		
Conversion speed	25ms / 2 channels (constant, regardless of the number of channels used)	Speed change rate	25ms / 2 channels (constant, regardless of the number of channels used)
Sampling period	25ms / 2 channels (constant, regardless of the number of channels used)	――	――
Absolute max. input	Microvoltage: ±12V, Voltage: ±15V Current: ±30mA	Permissible load resistance	600Ω or less
Input impedance	Thermocouple, Microvoltage, Voltage: 1MΩ, Current: 250Ω	Output impedance	5MΩ

Item	Specifications
Normal-mode rejection ratio	60dB or more (50/60Hz)
Common-mode rejection ratio	120dB or more (50/60Hz)
Input filter (Primary delay digital filter)	0.0 to 100.0s
Sensor compensation value setting	-50.00 to 50.00%
Control method	Continuous proportional control
PID constant range — PID constant setting	Setting possible by auto tuning
PID constant range — Proportional band (P)	Thermocouple: 0.1 to full scale ˚C / Microvoltage, voltage, current 0.1-1000.0%
PID constant range — Integral time (I)	0.0 to 3276.7s
PID constant range — Differential time (D)	0.0 to 3276.7s
Set value setting range	Thermocouple: Input range of thermocouple being used / Specified input range for Microvoltage, voltage, current
Dead band setting range	0.1 to 10.0%

Isolation specifications	Specific isolated area	Isolation method	Dielectric withstand voltage	Insulation resistance
	Between input and ground	Transformer isolation	500VAC for 1 minute	500VDC for 20MΩ or more
	Between input channels			

Item	Specifications
FeRAM reading/writing times	Max. 10^{10} times
Number of I/O occupied points	16 points (I/O assignment: intelligent 16 points)
Connector	18-point terminal block
Applicable wire size	0.3 to 0.75mm^2
Applicable solderless terminal	R1.25 to 3 (use of crimped terminal with sleeve is prohibited)
External power supply	DC24V +20%, -15% / Ripple, spike 500mVp-p or less / Inrush current: 0.2A, 4μs or less / 0.07A
Internal current consumption	0.27A
Weight	0.25kg
External dimensions	27.4 (W) x 98 (H) x 112 (D) mm

*1: Accuracy is calculated as follows:
    [Accuracy] = [Command accuracy] + [Reference junction temperature compensation accuracy]

(2) Supported I/P Sensor Types And Characteristics

Input		Input Range	Digital Value	Resolution
Thermocouple	K	-200 to 1372˚C	-2000 to 13720	0.1˚C
	J	-200 to 1200˚C	-2000 to 12000	
	T	-200 to 400˚C	-2000 to 4000	
	S	-50 to 1768˚C	-500 to 17680	
	R	-50 to 1768˚C	-500 to 17680	
	N	0 to 1300˚C	0 to 13000	
	E	-200 to 1000˚C	-2000 to 10000	
	B	0 to 1800˚C	0 to 18000	
	PLⅡ	0 to 1390˚C	0 to 13900	
	W5Re/W26Re	0 to 2300˚C	0 to 23000	
Microvoltage		0 to 10mV	0 to 20000	0.5μV
		0 to 100mV		5μV
		-10 to 10mV	-10000 to 10000	1μV
		-100 to 100mV		10μV
Voltage		0 to 1V	0 to 20000	0.05mV
		1 to 5V		0.2mV
		0 to 5V		0.25mV
		0 to 10V		0.5mV
		-1 to 1V	-10000 to 10000	0.1mV
		-5 to 5V		0.5mV
		-10 to 10V		1mV
Current		4 to 20mA	0 to 20000	0.8μA
		0 to 20mA		1μA

(3) Command Accuracy

(a) With ambient temperature of 23 ± 2˚C

Item		Error	
Thermocouple	K, J, T, E, PLⅡ	Less than -100˚C	±1.0˚C
		-100 to less than 500˚C	±0.5˚C
		500˚C or more	±[Command value x (0.1%) + 1 digit]
	S, R, N, W5Re/W26Re	-50 to less than 1000˚C	±1.0˚C
		1000˚C or more	±[Command value x (0.1%) + 1 digit]
	B	Less than 400˚C	±70.0˚C
		400 to less than 1000˚C	±1.0˚C
		1000˚C or more	±[Command value x (0.1%) + 1 digit]
Microvoltage		Full scale x (±0.1%)	
Voltage			
Current			

(b) With ambient temperature of 0 to 55˚C

Item		Error	
Thermocouple	K, J, T, E, PLⅡ	Less than -100˚C	±2.0˚C
		-100 to less than 500˚C	±1.0˚C
		500˚C or more	±[Command value x (0.2%) + 1 digit]
	S, R, N, W5Re/W26Re	-50 to less than 1000˚C	±2.0˚C
		1000˚C or more	±[Command value x (0.2%) + 1 digit]
	B	Less than 400˚C	±140.0˚C
		400 to less than 1000˚C	±2.0˚C
		1000˚C or more	±[Command value x (0.2%) + 1 digit]
Microvoltage		Full scale x (±0.2%)	
Voltage			
Current			

6. Online Module Change (Hot Swap) *1

In the event of Q62HLC failure, the Q62HLC can be replaced without stopping the system.

*1: Online module change can only be used with process CPU (QnPHCPU).

7. RFB (Reset FeedBack) Limiter

·When a deviation continues for an extended period of time, the RFB (reset feedback) limiter function performs an integral control action to prevent the PID operation result's "manipulated value MV" from exceeding the valid manipulated value (MV) range.

·The RFB limiter also prevents "overshooting" which can easily occur at startup, and when the set value (SV) is increased, etc.

8. Sensor Compensation

A sensor compensation value can be specified to prevent deviations between process values (PV) and the actual temperature, humidity, pressure, and flow rate.

9. Loop Disconnection Detection

This function detects control loop faults caused by problems with the load, external operation device, and inputs (sensor), etc.

The following Q62HLC operations are performed if an input disconnection occurs.

Input	Input Range	Operation
Thermocouple	All	Up-scale *2
Microvoltage		
Voltage	1 to 5V	Down-scale *3
	0 to 1V, -1 to 1V, 0 to 5V, -5 to 5V, 0 to 10V, -10 to 10V	0V vicinity value displays *4
Current	4 to 20mA	Down-scale
	0 to 20mA	0mA vicinity value displays *4

*2: Displays the [input range upper limit value] + [full scale x 5%] value.

*3: Displays the [input range lower limit value] + [full scale x 5%] value.

*4: No alarm is activated at any channel (even channels where no sensor is connected), because the process value (PV) is in the input range.

10. Scaling

This function automatically saves a scaled process value (PV) to the buffer memory.

11. Simple Analog Input/Output

This function allows the Q62HLC to serve as a simple thermocouple / microvoltage input module, a DI module, or an AI module by monitoring the process value (PV), and manually setting the manipulated value (MV).

12. Auto Tuning Mode Setting

This functions permits an auto tuning mode to be specified for the set control value, by setting the AT (auto tuning) operation gap time and the AT insertion loss time.

13. Setting Data Backup

Buffer memory setting data can be backed up to an FeRAM. If data is written directly to the buffer memory by using GX Developer TEST function, the minimum-requirement sequence program (LD** + "OUT Yn1") is adequate.

14. Easy Setting Using Utility Package

An optional utility package (GX Configurator-TC) is available.

Although the module can be setup using standard ladder programming. Using this utility tool greatly simplifies setup, without the need for any extra programming. Diagnostics can also be performed.

External dimensions

Unit: mm
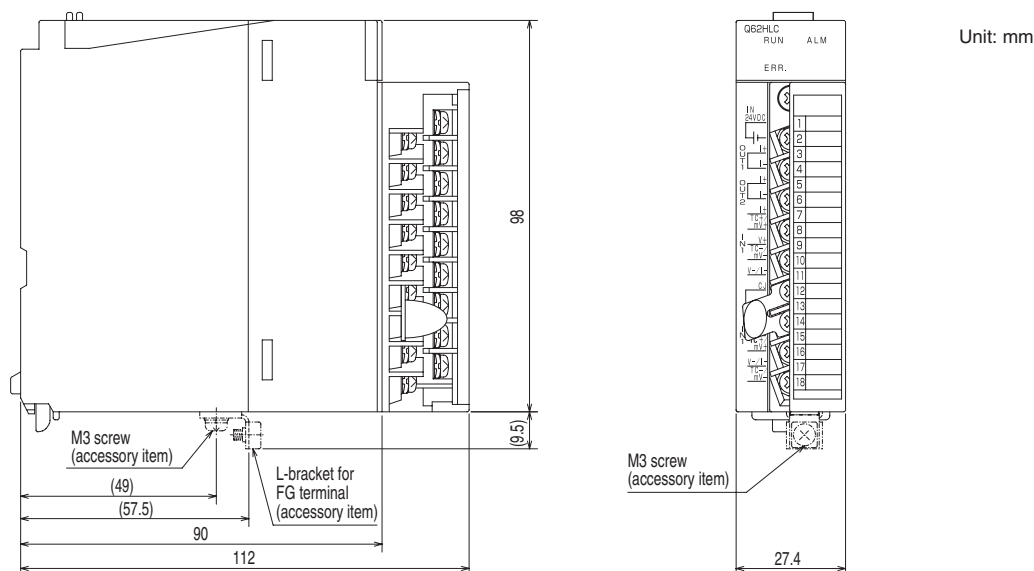
Product list

Product name	Model	Model code
Q62HLC type Loop Control Module	Q62HLC	1W4257
GX Configurator-TC Version 1	SW0D5C-QTCU-E*1	13PX16

*1: Version 1.20W and later are supported

Manual

Related manuals

Manual name	Manual supply status	IB/SH No.	Model code
Loop Control Module User's Manual (Hardware Edition)	Included with product	IB-0800319	13JP75
Loop Control Module User's Manual	Sold separately	SH-080573ENG	13JR85

Country/Region	Sales office	Tel/Fax
U.S.A	Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061	Tel : +1-847-478-2100 Fax : +1-847-478-2396
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South Africa	Circuit Breaker Industries LTD. Private Bag 2016, 1600 Isando, Tripswitch Drive, Elandsfontein Gauteng, South Africa	Tel : +27-11-928-2000 Fax : +27-11-392-2354
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Printed in Japan on recycled paper.